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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/907,364	07/17/2001	Bo Su Chen	M40 01375 US	6467

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HONEYWELL INTERNATIONAL INC.
101 COLUMBIA ROAD
P O BOX 2245
MORRISTOWN, NJ 07962-2245

EXAMINER	
FUREMAN, JARED	
ART UNIT	**PAPER NUMBER**
2876	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/907,364	CHEN, BO SU	
	Examiner	Art Unit	
	Jared J. Fureman	2876	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 July 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7-12,14,16-19 and 21-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,7-12,14,16-19 and 21-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Receipt is acknowledged of the RCE and amendment, filed on 7/1/2004, which has been entered in the file. Claims 1, 3, 4, 7-12, 14, 16-19, 21-32 are pending.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 5/3/2004 has been entered.

Specification

2. The abstract of the disclosure is objected to because the abstract is greater than 150 words. Correction is required. See MPEP § 608.01(b).

Claim Objections

3. Claims 11 and 16 are objected to because of the following informalities:

Claim 11:

Line 2, "end" should be replaced with --ends--.

Line 10, "members" should be replaced with --disks--, in order to correspond with "rotating disks" as recited in line 2.

Claim 16, line 2: "member" should be replaced with --disk--, in order to correspond with the "disk" as recited in claim 11.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 3, 4, 7, 9, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dalton et al (US 6,679,126 B2, previously cited) in view of Cui et al (US 6,399,940 B1, previously cited).

Dalton et al teaches a method for analyzing the performance of a system, comprising the steps of: directing light from at least one light source (150) towards identically encoded portions formed on planar surfaces formed on and located near inner perimeter surfaces of two disks (first wheel 140a and second wheel 140b) independently rotatable on two shafts (drive shaft segments 110) representing input and output mechanism of the system; transmitting a portion of the light towards a detector (160) from said encoded portions (light that passes through the slits 142 on the first and second wheels); detecting a transmitted portion of the light using the detector; and recovering information from said transmitted portion of the light, said information containing performance characteristic data of said system including torque between the two shafts; wherein the encoded portions comprise a bar code (the pattern of slits 142 on the first and second wheels can be considered a bar code, since the wheels will have portions of different reflectivity); wherein the encoded portions comprises at least one measuring feature (the slits 142) formed on a planar surface of

the disks; shaping said encoded portion of said disks to increase transmission of said transmitted light in a particular direction (the slits 142 increase transmission of light, in that the light can pass through the wheels in the location of the slits); assessing said system utilizing said performance characteristic data; generating an electrical feedback signal from information recovered from said transmitted portion of the light (the detector 160 generates an electrical output); and providing said electrical feedback signal to an input of said system (a circuit, not shown, that receives the electrical output from the sensor), thereby improving said performance characteristic data of said system (see figures 1-3, column 4 line 66 - column 5 line 42, and column 7 lines 16-36).

Dalton et al fails to specifically teach the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Dalton, the light source comprising a vertical cavity surface emitting laser, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

6. Claims 11, 12, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinnock (WO 99/39169 A1, previously cited) in view of Cui et al.

Pinnock teaches an apparatus for analyzing the performance of a system including two rotating disks (disk elements 10 or 12) independently attached to facing ends of input and output shafts (shafts 2 and 4) and a torsion bar (6) interconnecting the input and output shafts, said apparatus comprising: at least one directing element (a diffuser, not shown) that directs light from a light source (20) in order to intercept an encoded portion of said disks; at least one transmitting element (slots 16 or 18, having a higher optical transmissivity) associated with the encoded portion that transmits a transmitted portion of said light from said encoded portion of said disks; and at least one detector (sensor array 22) that detects the transmitted portion of said light to recover performance information maintained therein, wherein said performance information includes data about torque between the input and output shafts; recovery mechanism (data processor 24) that recovers information about a performance characteristic of said system; wherein the directing element comprises an optical lens (the diffuser represents an optical lens); wherein the encoded portion of the rotating disk comprises a bar code (disk element 12 includes slots 18 representing a portion of disk element 12 having higher optical transmissivity than the portions ("spokes") which separate the slots, thus, the encoded portion can be considered a bar code) (see figures 1-7, page 2 line 4 - page 3 line 7, and page 7 line 6 - page 10 line 8).

Pinnock fails to specifically teach the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock, the light source comprising a vertical cavity surface emitting laser, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dalton et al as modified by Cui et al as applied to claim 1 above, and further in view of Burke, Jr (US 3,688,570, previously cited).

Dalton et al as modified by Cui et al fails to specifically teach transmitting at least one light beam from said encoded portions of said disks to interact with at least one other light beam to form Moiré fringes on a sensor.

Burke, Jr teaches a method and apparatus for analyzing the performance of a system, comprising: a first encoded rotating member (shell 14), a second encoded rotating member (shell 22), a light source (32) generating a light beam, a sensor/detector (48, 53) receiving a light beam from the first encoded member and a light beam from the second encoded member to form Moiré fringes on the sensor/detector as a result of the interaction of images from the first and second encoded portions of the first and second rotating members (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

In view of Burke, Jr's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method as taught by Dalton et al as modified by Cui et al, transmitting at least one light beam from said encoded portions of said disks to interact with at least one other light beam to form Moiré fringes on a sensor, in order to take advantage of the sensitivity and displacement amplification capabilities of the Moiré fringe system (see column 3 lines 40-45 of Burke, Jr).

8. Claims 17-19, and 21-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pinnock in view Cui et al and of Burke, Jr.

The teachings of Pinnock have been discussed above. Pinnock also teaches an apparatus for detecting the relative motion between at least two rotating members in a system having a light source (20) for generating a light beam, said apparatus comprising: a first encoded portion (slot 16) located on surface of a first rotating member (disk element 10), the first encoded portion facing a second encoded portion (slot 18) located on a surface of a second rotating member (disk element 12), the first and second encoded portions used for the transmission of images created using said light beam; and a detector (sensor array 22), wherein said detector is located proximate to said system; a collimating lens (a diffuser, not shown) located proximate said system, wherein said collimating lens renders said light beam from said light source into a highly collimated parallel light beam, thereby directing said light beam to intercept said encoded portion on said first rotating member; wherein said at least one encoded portion comprises: a transparent polymer film (annular overlay 100) having

parallel lines of opaque bar code imprinted on an upper surface of said transparent polymer film; and wherein said opaque parallel lines are spaced evenly with a width of a gap formed therebetween, wherein the width of the gap corresponds to the width of said opaque parallel lines; and wherein said transparent polymer film is fixed to a rotating member (disk element 12); wherein said transparent polymer film comprises a bar code when adhered to a rotating disk; and wherein said bar code is adhered to a planar surface of a rotating member; wherein said light beam intercepts said first and second encoded portions of said rotating members at an angle of incidence of about 90.degree.; and wherein said light beam carries an image of said bar code after being transmitted over said encoded portions of said first and second rotating members; wherein said detector is located on a sensor (the sensor array 22 contains many detectors); wherein said encoded portion of the first rotating member is shaped to increase said transmitted light in a particular direction; wherein said encoded portion of the first rotating member is shaped to form an optical encoder for encoding information representing performance characteristics of said system; wherein said encoded portion of the first rotating member is provided as a vernier on said rotating member to increase accuracy for sensing motion thereof; wherein said encoded portion of the first rotating member comprises features recessed (the slots 16 and 18 are recessed into the surface of the disk elements 10 and 12, respectively) into a surface or edge of said rotating member (see figures 1-7, page 2 line 4 - page 3 line 7, and page 7 line 6 - page 10 line 8).

Pinnock fails to specifically teach the light source comprising a vertical cavity surface-emitting laser.

Cui et al teaches a method and apparatus for measuring the performance of a system, including the use of a vertical cavity surface-emitting laser (see column 7 lines 31-37).

In view of Cui et al's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock, the light source comprising a vertical cavity surface emitting laser, in order to provide a compact laser diode for the light source, thereby reducing the size of the apparatus.

Pinnock as modified by Cui et al fails to specifically teach transmitting at least one light beam from said encoded portions of said rotating member to interact with at least one other light beam to form Moiré fringes on a sensor; the detector detecting Moiré fringes formed as a result of the interaction of images from said first and second encoded portions of said first and second rotating members.

Burke, Jr teaches a method and apparatus for analyzing the performance of a system, comprising: a first encoded rotating member (shell 14), a second encoded rotating member (shell 22), a light source (32) generating a light beam, a sensor/detector (48, 53) receiving a light beam from the first encoded member and a light beam from the second encoded member to form Moiré fringes on the sensor/detector as a result of the interaction of images from the first and second

encoded portions of the first and second rotating members (see figures 1A, 1, 2, 4, column 1 lines 4-6, 59-67, and column 2 line 56 - column 5 line 64).

In view of Burke, Jr's teachings, it would have been obvious to one of ordinary skill in the art at the time of the invention to include, with the method and apparatus as taught by Pinnock as modified by Cui et al, transmitting at least one light beam from said encoded portions of said rotating member to interact with at least one other light beam to form Moiré fringes on a sensor; the detector detecting Moiré fringes formed as a result of the interaction of images from said first and second encoded portions of said first and second rotating members, in order to take advantage of the sensitivity and displacement amplification capabilities of the Moiré fringe system (see column 3 lines 40-45 of Burke, Jr).

Response to Arguments

9. Applicant's arguments filed 7/1/2004 have been fully considered but they are not persuasive.

In response to applicant's argument that Cui et al only teaches use of a vertical cavity surface emitting laser (VCSEL) as an optical rotary position encoder, one skilled in the art would not be motivated to combine a VCSEL with Pinnock et al to create the claimed invention (see page 9, of the amendment filed on 7/1/2004), Cui et al teaches the use of a VCSEL to detect movement in a mechanical system. Cui et al also mentions that the use of a VCSEL provides a compact laser diode module (see column 7 lines 31-37). Thus, one of ordinary skill in the art at the time of the invention would have been motivated to combine the VCSEL, as taught by Cui et al, with the apparatus

and method, as taught by Pinnock et al (and Dalton et al), in order to provide a compact light source, thereby allowing the apparatus to be of a small size. Thus, combination of the Pinnock et al/Dalton et al and Cui et al references meet the claimed limitations.

10. Applicant's other arguments with respect to claim 1 (for example, placement of encoded portions on the inner surfaces of two rotating members/disks, see page 10 of the amendment filed on 7/1/2004) have been considered but are moot in view of the new ground(s) of rejection. As discussed above, Dalton et al teaches the placement of encoded portions located near inner perimeter surfaces of two rotatable disks.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jared J. Fureman whose telephone number is (571) 272-2391. The examiner can normally be reached on 7:00 am - 4:30 PM M-T, and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael G. Lee can be reached on (571) 272-2398. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jared J. Fureman
Examiner
Art Unit 2876

August 6, 2004